



Koninklijk Nederlands
Meteorologisch Instituut
Ministerie van Verkeer en Waterstaat

Global and Regional Trends in OMI absorbing aerosol

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Aura Meeting
17 Sep 2009, Leiden

Project Setup and Methods

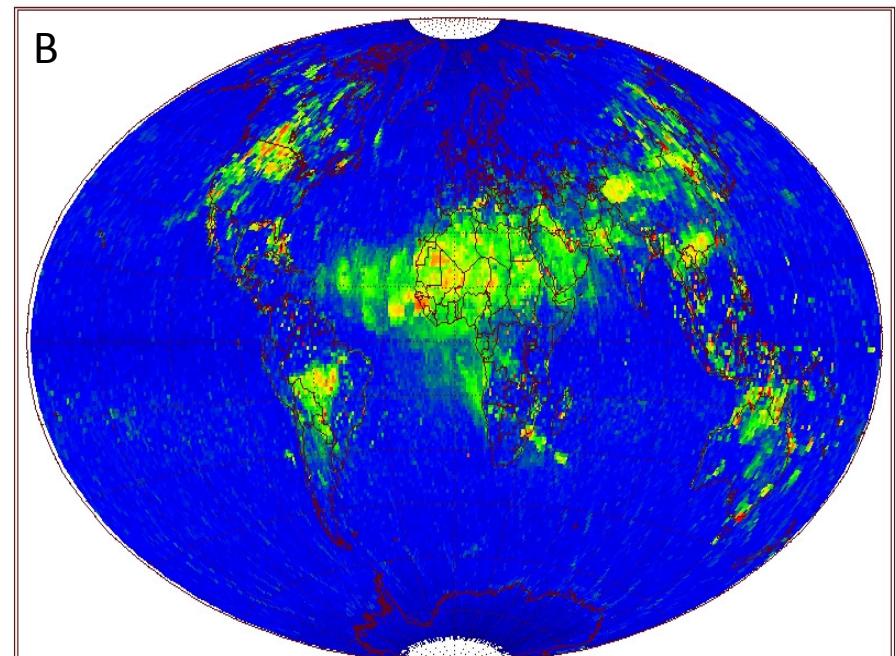
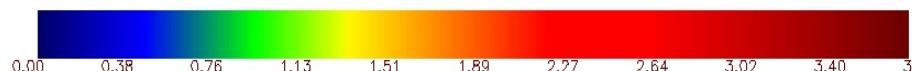
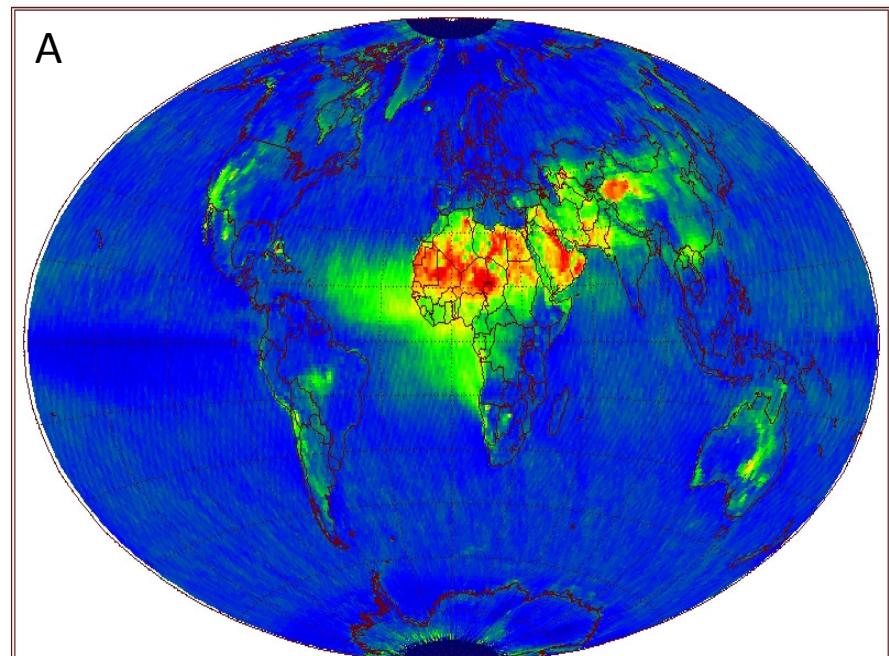
- OMI OMAERO UV Aerosol Index (AI) data
- Gridded to $1^{\circ} \times 1^{\circ}$; Monthly & Annual data
- Calculate descriptive statistics and histograms for each grid box
 - Histograms: What is driving monthly means?
- Look for temporal and spatial trends
 - Examples on global and regional scales
- Focus on the southern hemisphere
 - Episodic vs. Persistent sources

Methods (cont'd)

- OMI OMAERO AI product filtered for:
 - Sunglint (over ocean, 40° viewing angle cone)
 - Solar Zenith Angle > 60°
 - Errors and Warnings in Lev-1B radiances
 - AI values greater than 20
 - Eclipses: affected and neighboring orbits
 - Row anomaly affected pixels
 - Last month of data (Dec 2008) is slightly affected

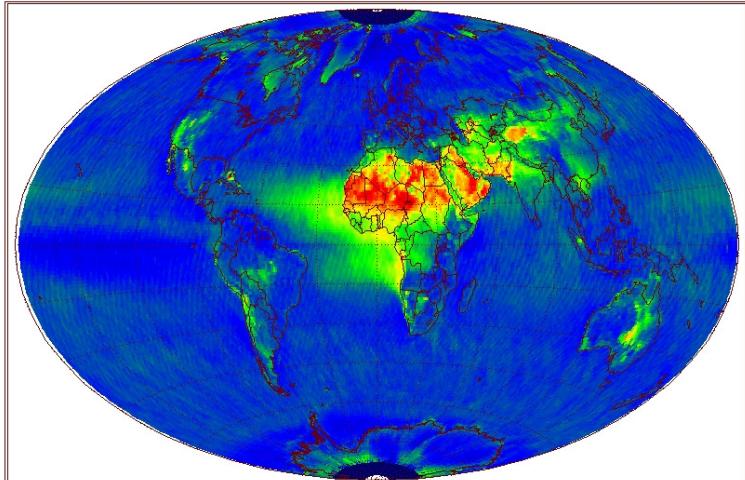
2007 Annual Average: Mean & Max

- Highlights the difference between persistent and episodic source regions

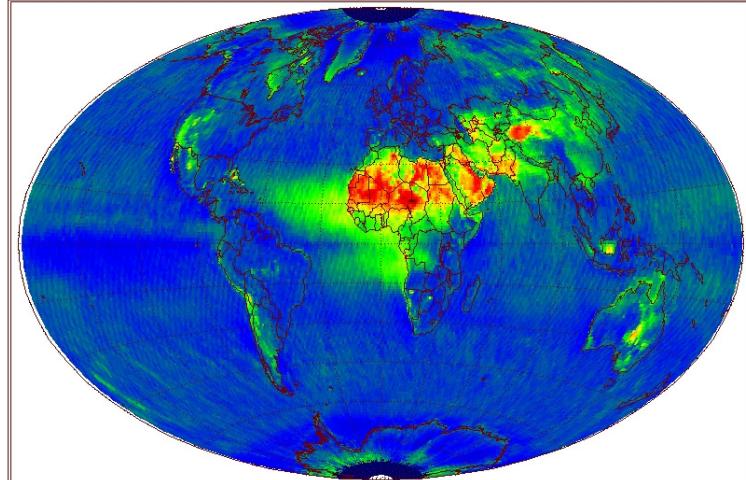


Annual Average Distribution – Mean AI

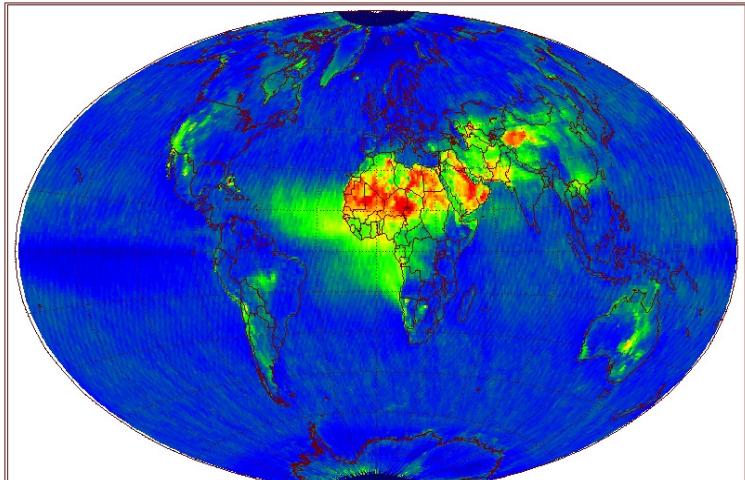
2005



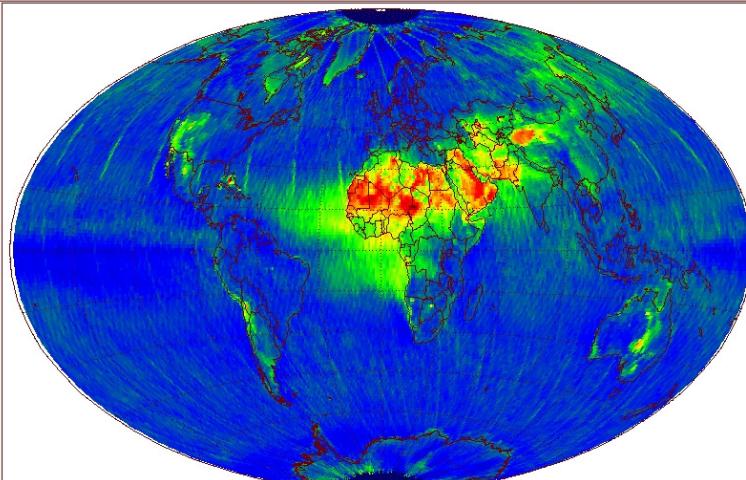
2006



2007



2008



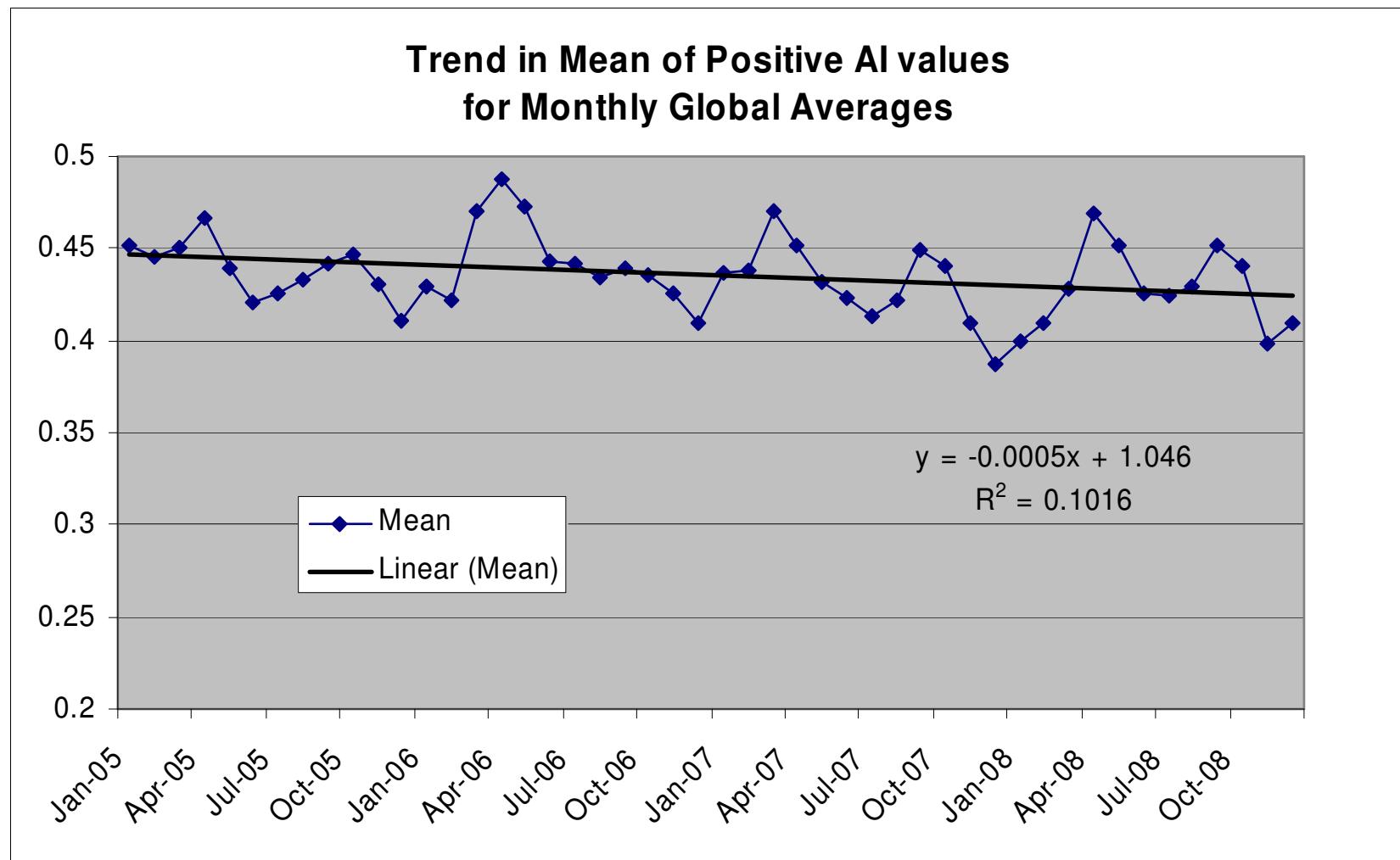
0.00 0.37 0.74 1.11 1.48 1.85 2.22 2.59 2.96 3.33 3.70

0.00 0.36 0.73 1.09 1.45 1.81 2.18 2.54 2.90 3.26 3.63

0.00 0.38 0.76 1.13 1.51 1.89 2.27 2.64 3.02 3.40 3.78

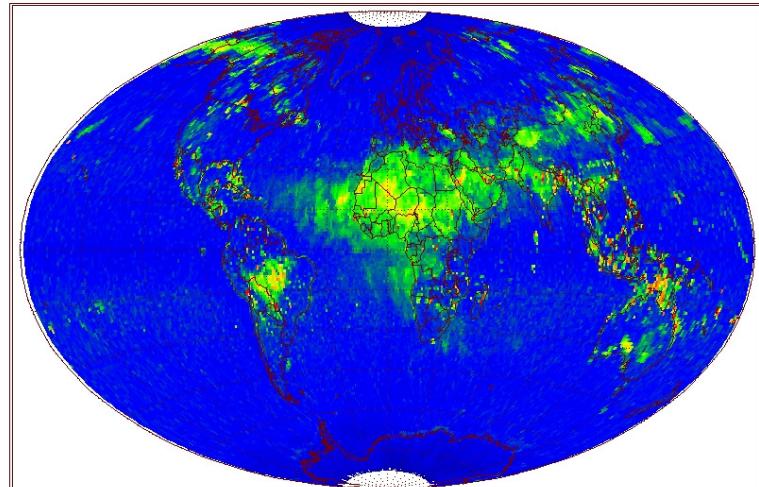
0.00 0.36 0.72 1.08 1.44 1.80 2.16 2.52 2.88 3.24 3.60

Temporal Trend: Global Monthly Mean AI 2005-2008

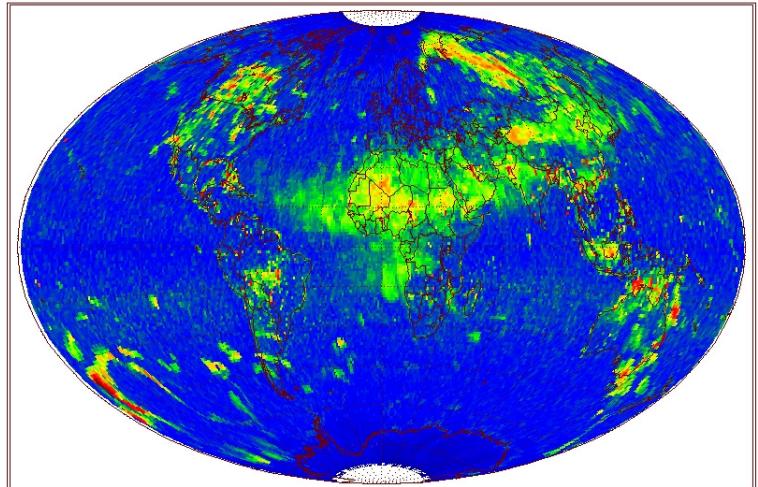


Annual Average Distribution – Max AI Important Episodic Source Regions

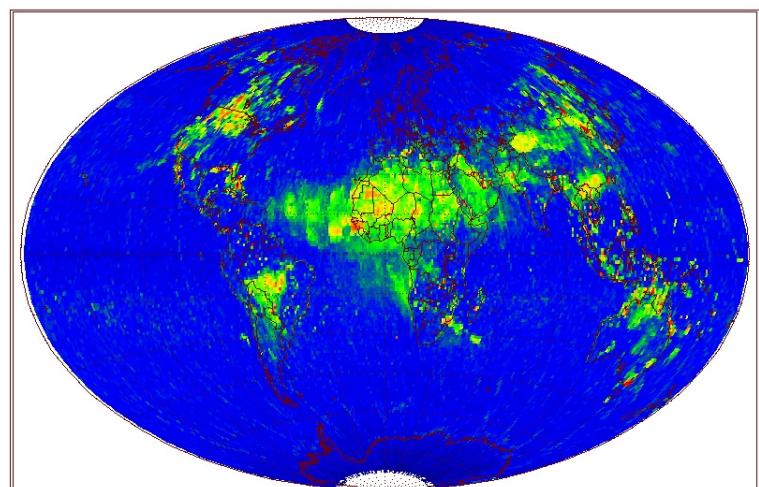
2005



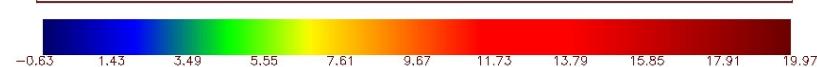
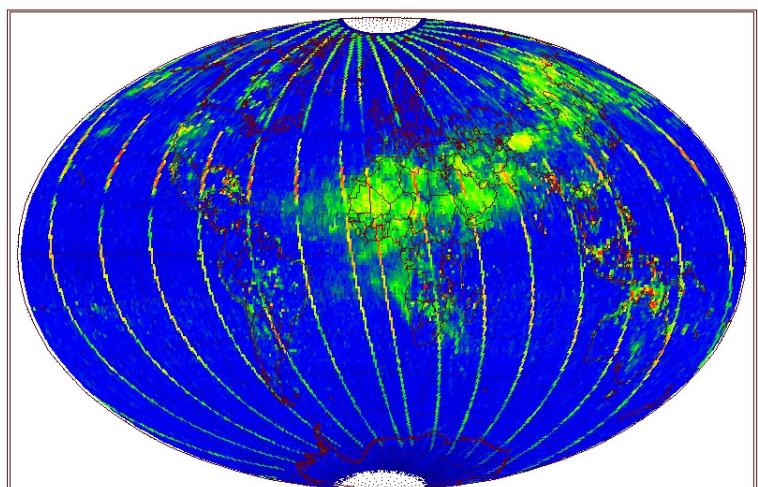
2006



2007



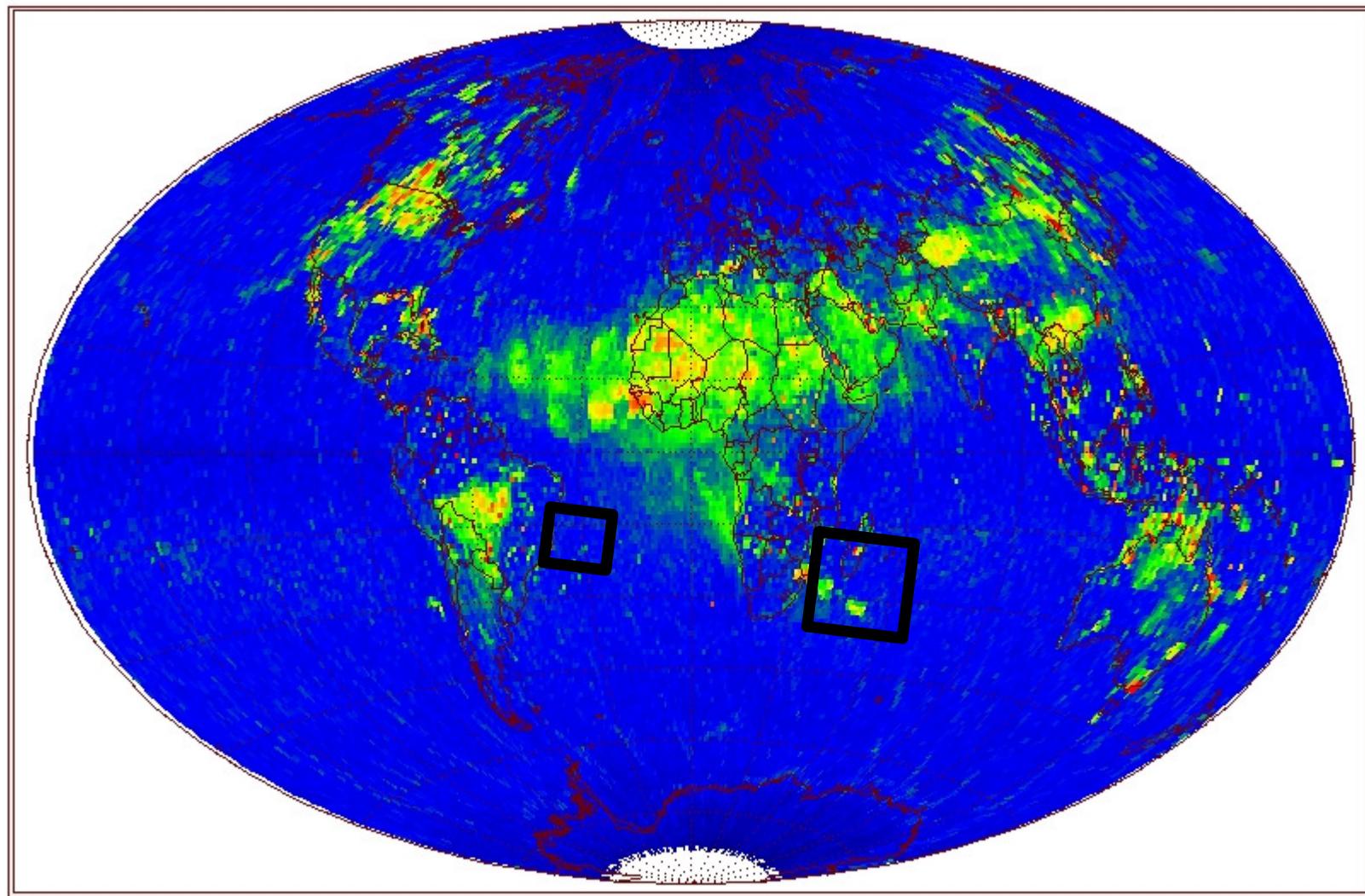
2008



Regional Trends in Southern Hemisphere

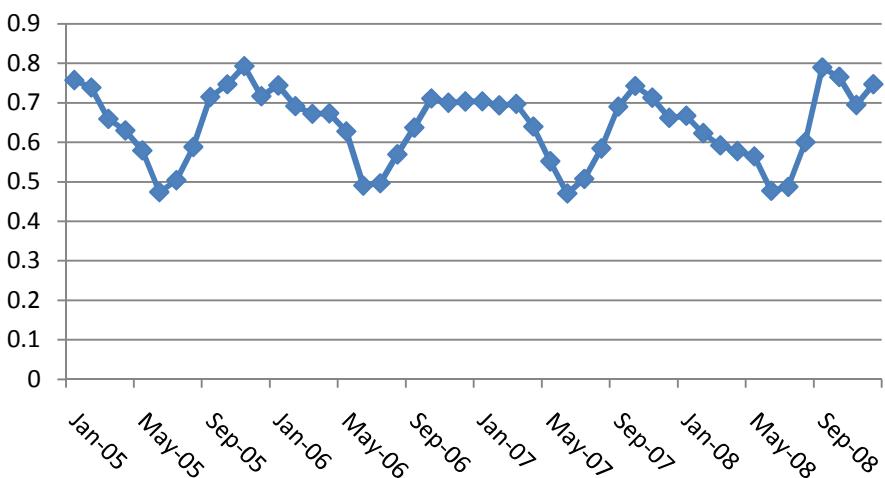
- A first look over oceanic regions where long-range transport of biomass burning aerosols
- Can we see the seasonal cycle and evidence of episodic transport farther away from the source region?
- South American, S. Atlantic Outflow
 - 40W to 20W, 15S to 30S
- Southern African, S. Indian Outflow
 - 35E to 60E, 20S to 40S

Regional Trends in Southern Hemisphere

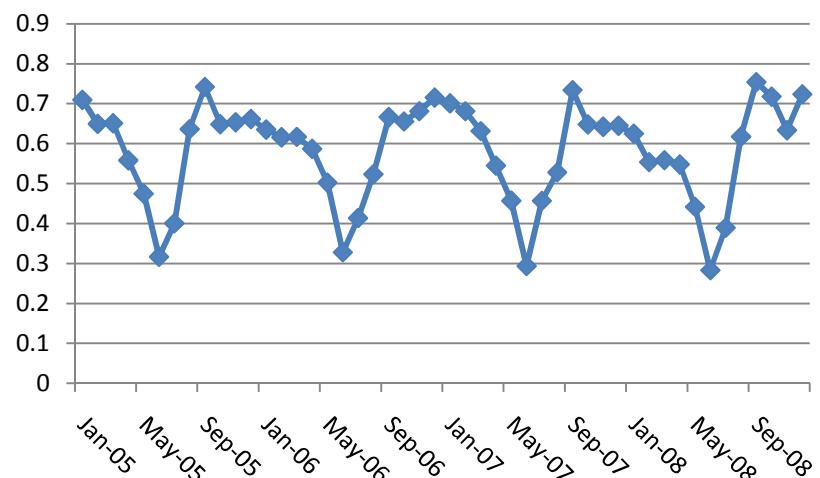


Monthly AI Means for S. Amer, S. Africa Outflow Regions

**Monthly Mean AI for S. Amer.
2005-2008**



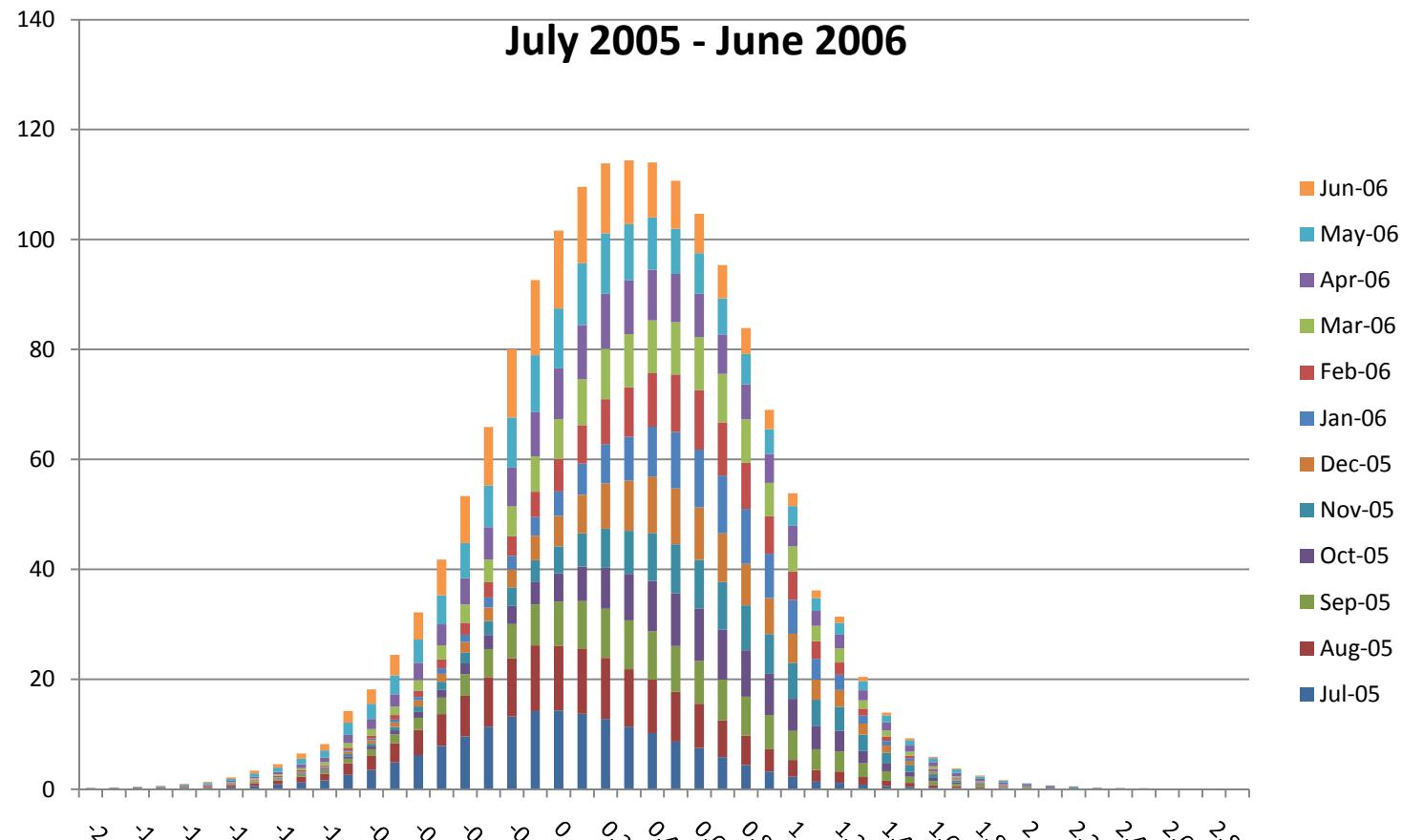
**Monthly Mean AI for S. Africa
2005-2008**



**Strong Seasonal Cycles for Both Regions:
Peaks correspond to maxima in Biomass Burning Seasons
July to June Cycling**

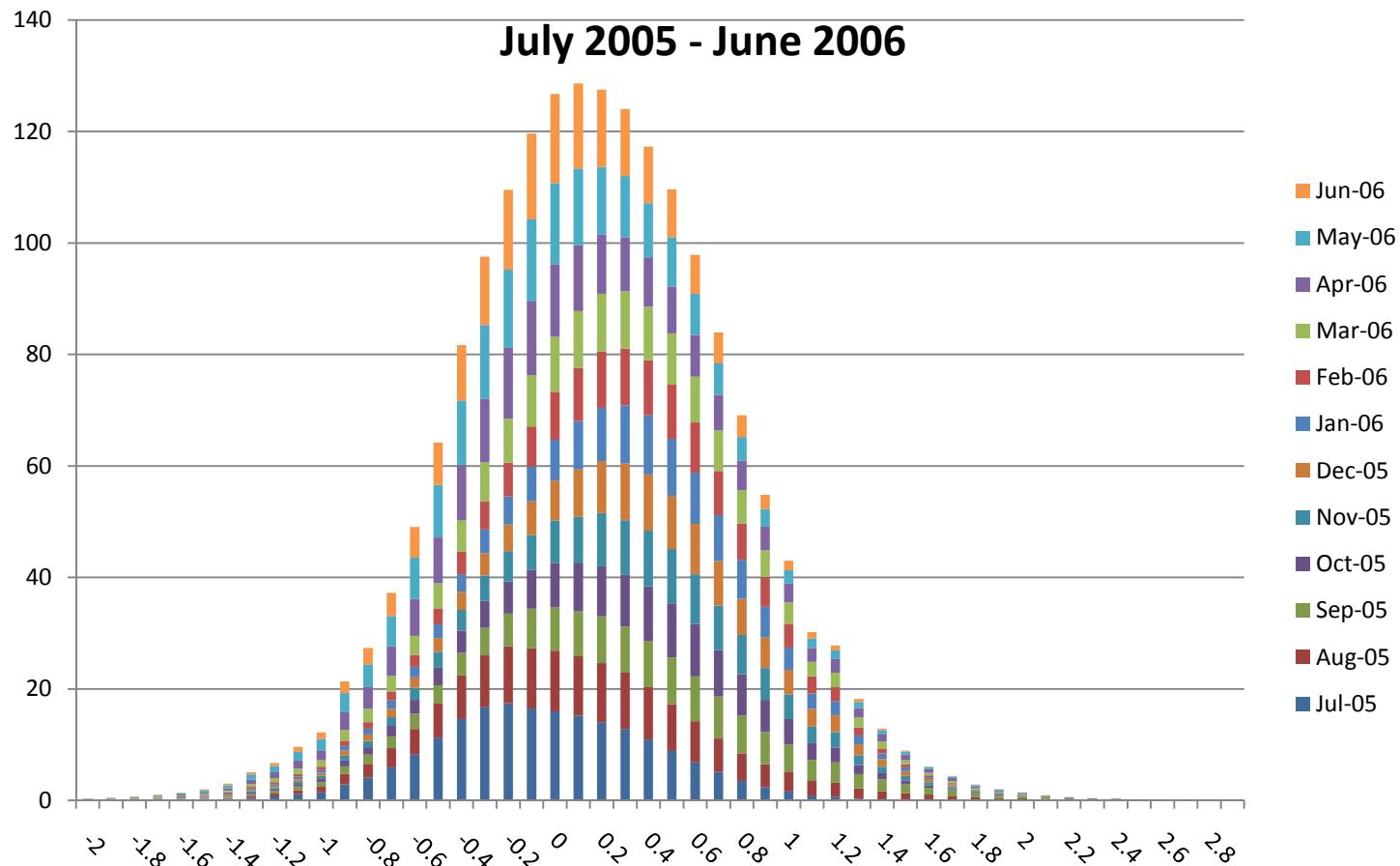
What is Driving these Positive Value AI Means?

Monthly AI Histograms for S. American Outflow Regions



**Seasonal Shift of the Peak of the AI distribution – Seasonal Cycle
in the Amount of Absorbers and Scatterers**

Monthly AI Histograms for Southern Africa Outflow Region



Seasonal Shift of the Peak of the AI distribution – Seasonal Cycle in the Amount of Absorbers and Scatterers

Summary & Future Work

- No temporal trends found in global positive AI values or in biomass burning outflow regions
- Outflow regions had enhanced presence of scatterers at times of peak absorbing aerosol emission and transport
- Trends and seasonal cycles in the positive values of AI should be evaluated along with negative values to better understand influence of scatterers
- Thanks for your attention!!

Extra Slides

Temporal Trends: Global Monthly Means 2005-2008

- Compare Raw AI values with Positive AI values

